

1 **ADJUSTABLE SHIFT LEVER ASSEMBLY**

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4 **TECHNICAL FIELD**

5 **[0001]** The invention relates to gearshift pedal assemblies for motorcycles.

6

7 **BACKGROUND - DESCRIPTION OF PRIOR ART**

8 **[0002]** A standard motorcycle gearshift pedal assembly is typically a four-part lever
9 device, made up of the gearshift pedal arm, the gearshift pedal lever, the gearshift pedal
10 lever connecting rivet and the gearshift pedal lever spring. The device is mounted in a
11 stock position and is used for manually shifting gears by using the foot to lift or lower the
12 position of the lever to the point that the multiple desired drive gears or the neutral
13 position is engaged. Once such engagement is accomplished, the lever is released and
14 automatically returns to its position prior to the 'shift' until the next change of gears is
15 desired. This shifting of gears is performed regularly in the process of riding a
16 motorcycle.

17

18 **[0003]** The gearshift pedal arm is typically about six inches long and curved to fit the
19 specific application, although the length and the shape of the arm varies between
20 manufacturers and models. The gearshift pedal arm attaches to the engine by connection
21 to the gearshift spindle. The gearshift spindle is a rod with a splined end for attachment to
22 the gearshift pedal arm. The gearshift spindle is part of the mechanical gearing linkage
23 and is connected to the engine. There are usually splined grooves inside the mounting

end, and these grooves must be lined up with matching grooves on the gearshift spindle when the connection is made for 'stock' installation position, by sliding the mounting end of the gearshift pedal arm onto the gearshift spindle.

[0004] The gearshift pedal arm is designed to be lifted up and pushed down manually, thereby rotating the gearshift spindle and causing the drive gears to shift up or down and into the neutral position. The gearshift pedal lever is the contact point for manual shifting with the foot. It typically has a tubular shaped and knurled horizontal knob that protrudes horizontally and outward, typically at 90 degrees, from a connection point at the end of the gearshift pedal arm

[0005] The gearshift pedal lever is connected to the gearshift pedal arm by the gearshift pedal lever rivet. The gearshift pedal lever rivet is usually a fixed rivet, which connects the gearshift pedal lever to the gearshift pedal arm and holds the gearshift pedal lever spring. This riveted connection does not compress the connection point between the gearshift pedal lever and the gearshift pedal arm. Rather, the rivet acts as a hinge point for the horizontally protruding gearshift pedal lever, allowing it to rotate backward or counterclockwise, typically on the order of 40 - 45 degrees, in the event of accidental impact, thus reducing the likelihood of breakage of the gearshift pedal assembly or bending of the gearshift pedal arm. The gearshift pedal lever is biased to return to its original position by the gearshift pedal lever spring that is positioned around the gearshift pedal lever rivet.

1 [0006] Shifting gears is performed frequently, while both standing and sitting, and
2 ideally the rider should be able to reach the shift lever comfortably reached with his foot
3 from the proper balance position stance on the footpeg. The correct balance position
4 stance is specific for each rider; however there is a generally accepted position for most
5 riding conditions which presumes that each foot is positioned on the footpeg in
6 approximately the same position, with the center portion of the foot resting on the
7 footpeg. This proper stance is ergonomically correct and best for appropriate balance and
8 weight distribution. Indeed, many boot manufacturers provide a replacement sole patch
9 in the center area of the boot as that section of the boot is expected to wear out through
10 constant contact with the footpeg.

11

12 [0007] However, current motorcycles are designed to fit an average-sized person, as
13 determined by the manufacturer. Most manufacturers build motorcycles to fit a male of
14 medium build, 150 to 160 pounds, with size 8-9 feet. In the case of the gearshift pedal
15 assembly, there is an obvious problem with anyone with a foot size much larger or
16 smaller than the average size: since stock gearshift pedal assemblies are not adjustable for
17 length and are positioned at distance from the footpeg predetermined by the
18 manufacturer, a rider with a larger or smaller than average foot may not be able to
19 comfortably or safely operate the shifter from the proper balance position stance on the
20 footpeg. Such riders must adjust their stance by moving one foot forward or back,
21 relative to their other foot, compromising balance and safety.

22

1 **[0008]** The gearshift pedal assembly may be removed from the gearshift spindle, rotated
2 clockwise or counter clockwise, and replaced it in a different position on the spindle
3 thereby relocating the knob higher or lower than the original stock position. But while it
4 is possible to vertically adjust the position of a stock shift lever in this manner, the
5 adjustment is usually impractical since rotating the distance of just one tooth of
6 adjustment on the spindle typically moves the knob about 10 mm, which is usually
7 greater than desired. This is because the spindle is not specifically designed to be a point
8 of adjustment, but is designed for easy removal and replacement of the lever assembly in
9 the stock position.

10

11 **[0009]** It is therefore an object of this invention to provide a gearshift pedal level system
12 that is adjustable in the horizontal and/or vertical directions.

13

14 **SUMMARY OF THE INVENTION**

15 **[0010]** The invention is directed to a replacement gearshift pedal lever for motorcycles
16 that is adjustable in that it allows the user to modify the distance between the foot peg
17 and the stock shift pedal lever and/or to adjust the height of the shift pedal lever. The
18 replacement pedal lever may preferably be attached to the stock pedal arm by means of a
19 screw assembly, although other means of attachment are possible. Alternatively, the user
20 may replace the stock pedal arm with a pedal arm specifically adapted to receive the
21 replacement gearshift pedal lever. It will be understood that in practice the pedal lever
22 may be designed for cooperation with the pedal arm of a specific model of motorcycle,
23 or, alternatively, an assembly including the pedal lever and a replacement pedal arm may

1 be provided.

2

3 **[0011]** Replacement pedal levers may be constructed in a variety of offset lengths thus

4 allowing the user to select a lever which creates the desired increase or decrease in the

5 distance between the footpeg and the lever. Typically, most foot sizes may be

6 accommodated with a choice of offsets between -5 mm and +15mm, although more

7 extreme sizes can be offered, e.g., -10mm and +20mm offsets. For levers with positive

8 offset, that is, that increase the distance between the footpeg and the lever, it is

9 advantageous to have an angled portion which allows the lever to avoid hitting the engine

10 or other parts of the motorcycle and maintains an appropriate position between the lever

11 and the footpeg.

12

13 **[0012]** The pedal lever may be attached to the pedal arm using two wing portions. The

14 wing portions may be positioned with sufficient distance between them so as to allow the

15 wing portions to fit over the cooperating portion of the pedal arm and allow one or more,

16 and preferably two or more, washers or similar shim devices, to be placed between the

17 interior of the wing portions and the pedal arm. By selectively positioning the washers

18 above and/or below the pedal arm, the lever may be raised or lowered allowing for

19 vertical adjustment of the pedal lever.

20

21 **[0013]** The use and advantages of the invention are more particularly described below.

22

1 **BRIEF DESCRIPTION OF THE DRAWINGS**

2 [0014] **FIG. 1** shows a replacement pedal lever in accordance with the invention
3 having a positive horizontal offset.

4 [0015] **FIG. 2** shows a replacement pedal lever in accordance with the invention
5 having a negative horizontal offset.

6 [0016] **FIG. 3** shows a replacement pedal lever in accordance with the invention
7 having no offset.

8 [0017] **FIG. 4** shows the replacement pedal lever adjusted vertically downward.

9 [0018] **FIG. 5** shows the replacement pedal lever adjusted vertically upward.

10 [0019] **FIG. 6** shows the replacement pedal lever adjusted to a neutral vertical
11 position.

12

13 **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT**

14 [0020] Specifically, the invented system comprises a selectable replacement pedal lever
15 100, 200, 300 which may be attached to the stock gearshift pedal arm by means of a
16 removable screw assembly.

17

18 [0021] With reference to Figures 1-3, the user may select a replacement gearshift pedal
19 lever 100, 200, 300 with one end 120, 220, 320 comprising a horizontal knob portion
20 101, 201, 301 that, when attached to the gearshift pedal arm by the removable screw
21 assembly of a button screw 420 and shoulder screw 430, preferably extends at around a
22 90 degree angle relative to the motorcycle body and approximately parallel to the
23 footpeg. The use of certain gearshift pedal levers 100, 200 results in an increase or

1 decrease in the distance between the footpeg and the pedal lever 100, 200 relative to the
2 distance between the footpeg and the stock pedal lever.

3
4 **[0022]** The pedal lever 100, 200, 300 further comprises a second end, 130, 230, 330
5 connected to an attachment section 102, 202, 302 that generally including two wing
6 portions 103, 203, 303 that fit over the cooperating portion of the pedal arm and include
7 holes 104, 204, 304. The holes 104, 204, 304 are adapted to accept a screw or other
8 fastener assembly, which may include a button screw 410 and a shoulder screw 420, and
9 are adapted to align with holes (not shown) formed in the cooperating portion of pedal
10 arm.

11
12 **[0023]** The knob portion can be viewed as forming a central axis 150, 250, 350 that runs
13 from the first end of the pedal lever to the second end of the pedal lever. As noted above,
14 the knob portion of these selectable gearshift pedal levers 100, 200 when attached for use,
15 have an increased or decreased distanced from the footpeg in comparison with as stock
16 pedal lever. This may be effected by creating a positive horizontal offset 110 or negative
17 horizontal offset 210 of the center of the fastening assembly, in these embodiments the
18 center of the hole 104, 204, by a selected distance from the central axis 150, 250 of the
19 knob portion 101, 201. A zero offset will usually result in a replacement pedal lever with
20 the knob portion at essentially the same distance from the footpeg as the stock pedal lever
21 knob. This is shown in Figure 3, where the center of the hole 304 lies on the axis 350.

22
23 **[0024]** The replacement pedal levers 100, 200, 300 may be constructed in a variety of

1 offset lengths. Typically, most foot sizes may be accommodated with a choice of -5 mm,
2 +5mm, +10mm and +15mm offsets, although more extreme sizes can be offered, e.g., -
3 10mm and +20mm offsets. It will be understood by a person of ordinary skill in the art
4 that the other offsets may be used. The offset of the center of the fastening assembly may
5 or may not correspond with the exact change in the distance between the footpeg and the
6 pedal lever depending on the shape of the device. Further, a pedal lever 300 with an
7 offset of zero or an offset that results in a distance between the footpeg and the level
8 essentially identical to that when the stock pedal lever is used, may also be offered, as the
9 system further provides for height adjustability.

10

11 **[0025]** Because of the angle at which the gearshift pedal arm typically extends from the
12 gearshift spindle, it is advantageous for a replacement pedal lever 100, especially a
13 replacement lever with a positive offset, to include an angled portion 105 such that the
14 position of the horizontal knob portion 101 relative to the motorcycle body and the
15 footpeg is maintained. Additionally, the angled portion 105 allows the pedal lever to
16 avoid hitting the engine or other portions of the motorcycle. It will be understood by
17 persons of ordinary skill in the art that the exact angle of the angled portion 105 will vary
18 depending on the offset selected and construction of the motorcycle.

19

20 **[0026]** With reference to Figures 4 - 6, the holes on the pedal arm will usually be
21 designed to accept a rivet, as most manufacturers' stock pedal levers are attached using a
22 rivet. To attach the pedal lever 400 (which may be any of pedal levers 100, 200, 300) to
23 the pedal arm 410, the user removes the standard rivet (for example, by drilling) which

1 typically connects the stock pedal lever to the pedal arm 410 and attaches the selected
2 pedal lever 400 to the pedal arm 410 using the removable screw assembly of the button
3 screw 420 and a shoulder screw 430. When replacing the rivet, the stock spring 450 may
4 be retained and used in the device for the purpose of allowing some rotational flexibility
5 and a return of the knob 401 to the proper position in the event of accidental impact;
6 alternatively, a new spring could be provided for use with the device.

7
8 **[0027]** The screw assembly shown allows for both replacement of the pedal lever and
9 slight vertical adjustment of the knob 401, through the use of moveable shims 440, such
10 as washers. It has been found that even a slight vertical adjustment, on the order of a few
11 millimeters, may have a significant effect on the comfort of the rider. It will be
12 understood, however, that other types of fastener assemblies, including fasteners that are
13 fixedly attached, in whole or in part, to the wing portions, may be used that would also
14 allow for the use of the moveable shims described below.

15
16 **[0028]** The wing portions 403 are positioned with sufficient distance between them so as
17 to allow the wing portions 403 to fit over the cooperating portion of the pedal arm 410
18 and allow one or more, preferably two or more, washers or similar shim devices 440, to
19 be placed between the interior of the wing portions 403 and the pedal arm 410. The
20 height of the pedal lever 400 may thereby be adjusted by selectively placing the washers
21 or shims 440 above or below the pedal arm 410. If two shim devices 440 are used,
22 placing both washers below the pedal arm, as shown in Figure 4, will raise the pedal lever
23 400; placing both washers above the pedal arm, as shown in Figure 5, will lower the

1 pedal lever 400. Alternatively, one washer may be placed above and one washer below
2 the pedal arm to maintain the stock horizontal position, as shown in Figure 6. When
3 using two washers, there are three position options. It will be appreciated that fewer or
4 more washers can be used with an associated increase or decrease in the number of
5 vertical positions possible. When using four washers, for example, there are five position
6 options.

7
8 **[0029]** The pedal levers may be constructed of appropriate material known to persons of
9 ordinary skill in the art, for example, appropriate grades of steel or aluminum. In one
10 embodiment, billet aluminum has been used successfully. The pedal levers and other
11 portions of the system may also be durably color coded through an annealing process to
12 allow immediate identification of, for example, the manufacturer for which the
13 replacement system is intended, the particular offset, or other pertinent information.

14
15 **[0030]** While the present invention has been shown and described with reference to the
16 foregoing preferred embodiment, it will be apparent to those skilled in the art that
17 changes in form, connection, and detail may be made therein without departing from the
18 spirit and scope of the invention as defined in the appended claims:

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